

CURRENT DRUG THERAPY

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Antibiotics for Staphylococcal Infections

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THE choice of drugs for the treatment of staphylococcal infections depends on several factors, the most important of which are the severity of the infection, the nature of the organism and the patient's history of any intolerance to penicillin.

If the patient has previously shown any allergy to penicillin, it is best to avoid using any of the penicillins. Current information indicates that the patient who is allergic to penicillin G is also allergic to the new penicillins—methicillin and oxacillin. However, intolerance to penicillin is not always permanent, and a very serious infection occasionally may warrant the administration of one of the penicillins to a sensitive patient as a calculated risk.

If the infection is severe, penicillin G is indicated, provided the organism is susceptible. Methicillin or oxacillin is the choice if the organism is resistant to penicillin G. Vancomycin is effective and may be used if the patient is allergic to penicillin.

If the infection is less severe, penicillin G, novobiocin or erythromycin may be used, if the organism is susceptible; oxacillin, novobiocin or erythromycin, if the organism is resistant to penicillin G.

When the infection is serious, *in vitro* tests to determine the susceptibility of the organism should be carried out as early as possible. Whereas staphylococci resistant to penicillin G are common, resistance to novobiocin is much less frequent and strains resistant to methicillin, oxacillin and vancomycin have seldom been found to the time of writing.

Penicillin G.—This is a most effective drug when the patient can tolerate it and where the organism is susceptible; it is preferable to methicillin or oxacillin. The intramuscular administration of 400,000 units of procaine penicillin with penicillin G in twice daily (b.i.d.) or thrice daily (t.i.d.) dosage will control many infections. If the patient is acutely ill, the intravenous route is preferred; this may be accomplished by adding 20-40 million units of crystalline penicillin G to the intravenous (i.v.) fluid daily. For less serious infections, oral penicillin, 500,000 units four times daily (q.i.d.) between meals, may be used. The most common untoward reaction to penicillin is an urticarial skin lesion. Angioneurotic edema occurs occasionally and anaphylactic shock is a rare, but very serious or even fatal complication.

Methicillin.—The common trade names for this semisynthetic penicillin are Staphcillin and Celbenin. It will usually be the choice when the organism is resistant to penicillin G. It is given intramuscularly, 1 g. every four or six hours (q.4.h. or q.6.h.) or 6 to 10 g. daily intravenously, injected into the I.V. tubing rather than placed into the I.V. bottle.

Oxacillin.—This drug is sold under the trade name of Prostaphlin and, like methicillin, is useful when the organism is resistant to penicillin G. It may be administered orally, 500 mg. q.i.d. between meals, or for more severe infections, 250 mg. q.6.h. intramuscularly.

Vancomycin.—This drug is as effective as methicillin and will be the logical choice for treating a patient who is seriously ill and has previously shown a hypersensitivity to one of the penicillins. It must be given intravenously 2 to 3 g. daily for the first two days, with reduction to half this dose for the remainder of therapy, which may last 10 to 14 days. Thrombophlebitis at the site of intravenous administration is the commonest complication and a drug fever is sometimes seen after a few days of therapy.

Novobiocin.—This is a useful drug for the treatment of less serious infections, 2 g. the first day followed by 1 g. daily (250 mg. q.i.d.). Staphylococcal resistance to novobiocin is uncommon. Allergic skin reactions occur in some patients following its use, and jaundice is a less frequent complication.

Erythromycin.—This is an alternative drug when the patient is not acutely ill. The dose is the same as for novobiocin. There is considerable geographical variation in the occurrence of strains of staphylococci resistant to erythromycin, but for the most part they are uncommon. Side reactions to this drug are not often seen, although when the propionate salt is used for prolonged periods, jaundice may occur.

Occasionally, an acutely ill patient may not respond to intensive therapy with the drugs listed above. If after four to five days the patient's condition has not improved or is deteriorating, kanamycin 500 mg. b.i.d. or t.i.d., intramuscularly, may be given as a trial for six to eight days. This drug is potentially ototoxic and neurotoxic. Alternatively erythromycin 3 to 4 g. daily, intravenously, along with one of the penicillins may be tried.

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Chloramphenicol, although frequently an effective drug for staphylococcal infections, is not recommended because of its toxicity for the bone marrow. Tetracyclines also are sometimes effective for less serious infections, but the drugs listed in the previous paragraphs are felt to be preferable. A "penicillin-streptomycin" combination is not adequate therapy for a serious staphylococcal infection.

Ampicillin (Penbritin) is also one of the newer penicillins, but this drug is *not* effective in the treatment of a staphylococcal infection where the organism is resistant to penicillin G.

Where a collection of pus has occurred, surgical drainage is usually an important part of the treatment of the infection, and when a staphylococcal

infection arises around a prosthesis that has been inserted in the heart or brain, antibiotic therapy is not usually successful unless the foreign body is first removed. This applies whether the organism is coagulase-positive or coagulase-negative.

In summary, then, for the patient seriously ill with a staphylococcal infection, methicillin or oxacillin should be given parenterally in full dosage as outlined above, as soon as blood has been drawn for a blood culture or a specimen of the exudate has been obtained for culture. If the organism is shown to be sensitive to penicillin G, a switch to that antibiotic can be made. If the patient has a history of penicillin allergy, vancomycin should be given intravenously.

CASE REPORT

Extradural Spinal Hemorrhage

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EXTRADURAL hemorrhage of the spine is a rare condition, first described by Blauby in 1808. Since that time, a number of articles have appeared on this subject, and recently papers by Loughheed and Hoffman,¹ Lin² and Sumner³ have brought to 37 the number of cases reported in the literature.

This paper presents four cases—three proved and one questionable, each of the four apparently stemming from a different etiology.

CASE 1.—The first case is a questionable one. L.B., a 72-year-old man, was admitted to hospital on January 13, 1959, complaining of abdominal cramps and constipation of several days' duration. A diagnosis of intestinal obstruction was made and on the day of admission a defunctioning colostomy was done. There was free fluid in the peritoneal cavity at this time, evidence of perforation. Three weeks following his colostomy, a second operation was performed under epidural anesthesia. This consisted of a left hemicolectomy along with a small-bowel resection for carcinoma of the large bowel with adherence of a portion of the small bowel. At operation the aortic and iliac vessels were noted to be calcified. Two hours postoperatively, cyanosis and coldness of his left foot were noted. There was pulsation in his left common femoral artery, but no pulsation of the vessels distal to this. The patient was treated with heparin, 100 mg. intravenously in repeated doses, and papaverine. The patient's clotting time was kept between 10 and 20 minutes. Two days later, it was noted that he had paralysis of both lower limbs. There were no deep tendon reflexes in the knees or ankles.

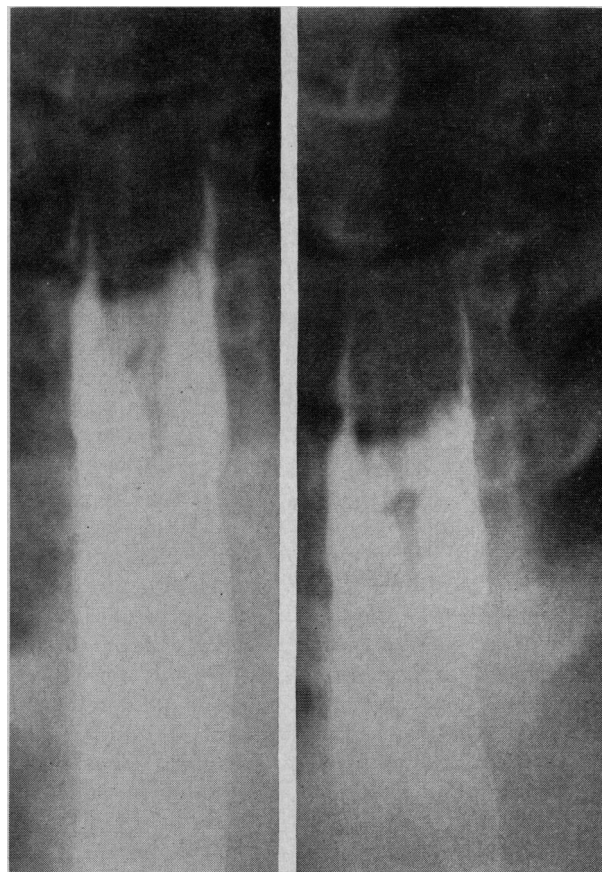


Fig. 1.—Case 2—D.L. Myelogram shows an incomplete block at T2-3.

He was sensitive to pinprick to the level of T12. A lumbar puncture was attempted and this revealed brownish-black blood, about 30 c.c. of which was as-